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(DC-03090)

PATENT APPLICATION
09/955,683

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Clint H. O'Connor et al.
Serial No.:	09/955,683
Date Filed:	September 19, 2001
Group Art Unit:	2142
Examiner:	Harrell, Robert B.
Title:	A SYSTEM AND METHOD FOR STRATEGIC POWER SUPPLY SEQUENCING IN A COMPUTER SYSTEM WITH MULTIPLE PROCESSING RESOURCES AND MULTIPLE POWER SUPPLIES

MAIL STOP – APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Further to the Final Office Action mailed December 27, 2005, the Notice of Appeal submitted on February 27, 2006, and the Notice of Panel Decision from Pre-Appeal Brief Review mailed April 28, 2006 in connection with the above referenced application, Appellants hereby submit this Appeal Brief according to 37 C.F.R. § 41.37.

A Petition extending the period for response is submitted herewith.

I. REAL PARTY IN INTEREST

The application is currently owned by Dell Products L.P. as indicated by an assignment recorded on September 19, 2001, in the Assignment Records of the United States Patent and Trademark Office at Reel 012191, Frame 0692.

II. RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision regarding this appeal.

III. STATUS OF CLAIMS

Claims allowed: None

Claims objected to: None

Claims rejected: 1-25

Claims canceled: None

Claims appealed: 1-25

IV. STATUS OF AMENDMENTS

An amendment filed subsequent to the Final Office Action proposing an amendment to Claim 12, was not entered because the amendment was indicated as raising new issues requiring further consideration and/or search and because the amendment was not deemed to place the application in better form for allowance.¹

V. SUMMARY OF CLAIMED SUBJECT MATTER

¹ The Advisory Action also included a Notice of Non Compliant Amendment issued because Appellants' inadvertent deletion of claim 22 from the claim listing in the after-final response was assumed by the Examiner to indicate Appellants' desire to cancel claim 22, which would leave dependent claims 23-25 without a base claim on which to depend. Appellants do not address this issue herein because it is moot in view of the non entry of the proposed response. In the event that the amendment is entered at some point in the future however, Appellants wish to hereby state that it was not their intention to cancel claim 22 and the inclusion of arguments specifically directed to claim 22 in the after-final response renders the Examiner's assumption of cancellation difficult to comprehend.

Independent Claim 1 recites a computer system (*see, e.g.*, FIG. 1, system 10; FIG. 3, system 60; Paragraphs [0027], [0060]) including a plurality of processing resources operable to process data (*see, e.g.*, FIG. 1, server 12, processors 16, motherboard 18; FIG. 3, servers 12, 64 and 66, processors 16, 70 and 72; Paragraphs [0027]-[0029], [0060-0062]), a plurality of power supplies associated with the processing resources, the power supplies operable to supply power to the processing resources (*see, e.g.*, FIG. 1, power supplies 22; FIG. 3, power supplies 22, 74, and 76; Paragraphs [0031]-[0032], [0061]-[0064]), and a power management engine associated with the power supplies, the power management engine operable to adjust the power supplies to optimize power consumption (*see, e.g.*, FIG. 1, power management engine 13; FIG. 3, power management engine 13; Paragraphs [0027], [0038]-[0041], [0047]-[0051], [0055], [0060], [0065]-[0066], [0071]).

Independent Claim 12 recites a method for strategic power sequencing in a computer system (*see, e.g.*, FIG. 4; Paragraph [0068]). The system includes multiple processing resources and multiple power supplies (*see, e.g.*, FIG. 1, server 12, processors 16, motherboard 18, power supplies 22; FIG. 3, servers 12, 64 and 66, processors 16, 70 and 72, power supplies 22, 74 and 76; Paragraphs [0027]-[0029], [0031]-[0032], [0060]-[0064], [0068]). The method includes receiving a demand requirement (*see, e.g.* FIG. 4, step 92; Paragraph [0069]), determining if the demand requirement requires a change in operating processing resource (*see, e.g.* FIG. 4, step 94; Paragraph [0069]), determining if the change in operating processing resources requires a power supply change (*see, e.g.*, FIG. 4, steps 104, 106, 114, 116, 118; Paragraphs [0071]-[0073]), and adjusting the number of operating power supplies to satisfy the change in processing resources (*see, e.g.*, FIG. 4, steps 108, 122; Paragraphs [0071]-[0073]).

Independent Claim 22 recites a method for managing power consumption in a computer system. The computer system includes multiple processing resources and multiple power supplies (*see, e.g.*, FIG. 1, server 12, processors 16, motherboard 18, power supplies 22; FIG. 3, servers 12, 64 and 66, processors 16, 70 and 72, power supplies 22, 74 and 76; Paragraphs [0027]-[0029], [0031]-[0032], [0060]-[0064]). The method includes predicting future demand requirements (*see, e.g.*, Paragraphs [0054]-[0058], [0072]), determining if a

processing resource change is needed to efficiently meet the future demand requirements (*see, e.g.*, FIG. 4, step 116; Paragraph [0072]), determining if the processing resource change requires a power supply change (*see, e.g.*, FIG. 4, step 118; Paragraph [0073]), scaling the processing resources in advance to meet the future demand requirements (*see, e.g.*, Paragraphs [0054]-[0058]); and adjusting the power supplies in advance to meet the processing resource change (*see, e.g.*, Paragraphs [0054]-[0058]).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants request that the Board review the sole ground of rejection, namely, Examiner's rejection of Claims 1-25 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,859,882 issued to Henry T. Fung ("Fung").

VII. ARGUMENT

A. The Rejection of Claims 1-25 under 35 U.S.C. § 102(e) is Improper

Claims 1-11

The rejection of claims 1-11 as anticipated by Fung is improper because Fung does not disclose either expressly or inherently a power management engine operable to adjust power supplies to optimize power consumption.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co. Ltd.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Appellants respectfully submit that Fung does not anticipate independent claim 1 because Fung does not disclose expressly or inherently all of the elements of claim 1. Claim 1 recites a computer system that includes, among other elements, a power management

engine operable to adjust power supplies to optimize power consumption. As Appellants have previously argued to the Examiner, Fung fails to disclose either expressly or inherently a power management engine operable to adjust power supplies to optimize power consumption.

Purporting to respond to Appellants' position in the Final Office Action, the Examiner cited to Col. 37, line 1. Line 1 of Fung recites "those skilled in the art to optimize or near-optimize some". Appellants assume the Examiner is not really suggesting that these words anticipate much of anything, but, more likely, the Examiner probably intended to include a more specific citation to Fung in support of the rejection to further Appellants' understanding of the rejection and thereby enable Appellants to respond meaningfully. In the absence of such a citation, however, Appellants will first address the portions of Fung cited, at non final rejection, as anticipating the claim element under discussion. The Examiner has effectively incorporated by reference the non final office action into the final office action.

At non final office action, Examiner supported the anticipation rejection of claim 1 by indicating that Fung's Title, among other things, provides support for an anticipation rejection of a management engine operable to adjust power supplies. Although somewhat unorthodox, the Examiner's reliance on Fung's title is instructive in the sense that it reveals a fundamental flaw in the Examiner's rejection. The title of Fung is *System, Method, and Architecture For Dynamic Server Power Management and Dynamic Workload Management for Multi-Server Environment*. What this Title does suggest is power management. What it does not teach expressly or inherently and what the Examiner has inexplicably refused to acknowledge is that dynamic server power management alone is not anticipatory of an engine operable to adjust power supplies to optimize power consumption. Because "power management" can refer to any number of concepts that do not involve adjusting power supplies to optimize power consumption, Fung's general references to power management are not express or inherent teachings of an engine that is operable to adjust power supplies.

In addition to the Title, the Examiner cites to the Abstract and column 4 lines 26-44, which contain a substantially verbatim reproduction of the pertinent portions of the Abstract, as anticipatory. Without reproducing the Abstract in its entirety, Appellants submit that the Abstract contains no express or inherent description of an engine operable to adjust power

supplies to optimize power consumption. The only reference to power supplies in the Abstract is a passage indicating that Fung's system may include modular power supplies. Examiner does not attempt to explain how this disclosure provides sufficient support for the anticipation rejection and it is readily evident to Appellants that the Examiner cannot do so because the Abstract and the column 4 passage cited by the Examiner contain no express or inherent disclosure of an engine operable to adjust power supplies to optimize power consumption. The passages unambiguously lack an express description of such an engine and there is nothing inherent in a modular power supply in and of itself that would require such an engine.

The Examiner's fourth and final citation in the non final office action, to column 28, lines 26-35, is also insufficient to support the anticipation rejection, as is a subsequent and similar passage at column 29 line 64 through column 30 line 11. In both of these passages, Fung refers to "power supply control and monitoring features." The subsequent description of these features however reveals that the disclosed "control and monitoring features" refer only to a mechanism to cycle power (or voltage) or shut down a power supply module entirely upon receipt of a message generated in response to the detection of an alarm or a failure condition. Assuming the broadest conceivable interpretation of the claim term "adjust," Fung's disclosure of a power supply alarm monitor still does not anticipate a management engine operable to adjust power supplies to optimize power consumption because Fung's power supply alarm monitoring feature is not a power consumption optimization feature.

To the extent that the Examiner, in his final office action citation to column 37, line 1, was attempting to refer to text immediately before and after column 37, line 1, Appellants will discuss the anticipatory character of that text for the sake of completeness. The text immediately before and after column 37, line 1 reads (the grammatical errors and discontinuities in the following passage are present in the original):

As general multi-power management policy it is observed based on analytical and empirical data, that there is a certain power consumption overhead associated with each server device and that it is therefore generally preferred to operate a minimum number of server modules at near their maximum output (Mode 1). When a single device approaches its capacity, other server devices are brought up from a Mode 3 to Mode 2 or Mode 1 operation. Frequently, the two servers than on line would each operate in Mode 2 until further performance is needed, at which time one would be brought to Mode 1 operation. This is merely an example scenario and many other

alternative control strategies may be applied. Clearly, there is a bodies [sic] of knowledge for both open-loop and feed-back based control that may be used by those skill in the art to optimize or near-optimize some weighted combination of performance and power conservation.

Col. 36, line 54 - Col. 37, line 3.

The paragraph above describes an example of managing servers in different operating modes (Mode 1, 2 or 3) in order to optimize power conservation and performance. Appellants submit, however, that a description of optimization and power conservation by managing server modules does not anticipate a management engine operable to adjust power supplies. There is no express reference to adjusting power supplies and, with respect to inherency, servers may be managed to optimize power conservation and performance in ways not involving adjusting power supplies (e.g., controlling the frequency or clock speed of a microprocessor). The cited paragraph simply provides no express or inherent disclosure of an engine operable to adjust power supplies to optimize power consumption.

In summary, Appellants respectfully contend that the argument provided in the Final Office Action is clearly flawed and the support for the anticipation rejection is insufficient. Namely, while Fung discusses server management, e.g., by employing different operating modes, to optimize performance and power conservation, Fung does not expressly or inherently disclose a management engine to adjust power supplies to optimize power consumption. For these reasons, and the reasons described in Appellants' Response dated December 27, 2005, Appellants contend that the anticipation rejection of independent Claim 1 is improper, as is the rejection of Claims 2 through 11, which all depend from and provide further patentable limitations to Claim 1, and which were all rejected as being anticipated by Fung. Accordingly, Appellants respectfully request the Board to reverse the 35 U.S.C. § 102(e) rejection of Claims 1-11 and allow the claims.

Claims 12-21

The rejection of claims 12-21 as being anticipated by Fung is improper because Fung does not disclose either expressly or inherently adjusting the number of operating power supplies following receipt of a demand requirement.

Independent Claim 12 recites a method for strategic power sequencing that includes, among other steps, “receiving a demand requirement ... and adjusting the number of operating power supplies... .”

At non final office action, the Examiner indicated that Claim 12 did “not teach or defined (sic) above the correspondingly claims given above, and [is] thus rejected for the same reasons given above.” Although not entirely understanding the quoted sentence, Appellants recognize that the Examiner has based the rejection of claim 12 solely on arguments advanced in claims 1-11. Among those claims, the claim containing language most closely corresponding to the demand requirement recited in claim 12 is claim 10, which recites a management engine operable to scale a plurality of processing resources in relation to a plurality of demand requirements. At non final rejection, the Examiner rejected claim 10 based on the following analysis. “Per claim 10, such would be that which controlled and managed the ‘workload’, as covered in the Abstract for example, of the totality of the system covered by Fung.” To the extent that Appellants have correctly deciphered this cryptic pronouncement, Appellants traverse because the Abstract does not disclose expressly or inherently receiving demand requirements and adjusting the number of power supplies based on the demand requirements. As indicated above, the abstract refers to power supplies only to mention that Fung’s system might include modular power supplies. Appellants can only say that the disclosure relied upon by the Examiner in support of the rejection is remarkably unanticipating of the elements recited in the rejected claim.

In summary, Appellants respectfully contend that the argument provided in the Final Office Action is clearly flawed. Specifically, while Fung contemplates the management of servers (using different operating modes) in order to optimize performance and power conservation, Fung does not contemplate the adjustment of power supplies in order to accommodate a demand requirement. For these reasons, and the reasons described in Appellants’ Response dated December 27, 2005, Appellants contend that the rejection of Claim 12 is improper, as is the rejection of Claims 13 through 21, which depend from and provide further patentable limitations to Claim 12. Accordingly, Appellants respectfully request the Board to reverse the 35 U.S.C. § 102(e) rejection of claims 12-21.

Independent Claims 22-25

The rejection of claims 22-25 as being anticipated by Fung is improper because Fung does not disclose either expressly or inherently adjusting power supplies in advance to meet future (predicted) demand requirements.

Independent Claim 22 recites a method for managing power consumption in a computer system that includes, among other steps, “predicting future demand requirements ... adjusting the power supplies in advance... .”

Appellants argued in response to the non final office action that Fung fails to teach the adjustment of power supplies based upon a predicted demand requirement. In the Final Office Action, the Examiner responded to this argument by citing the following portion of Fung (Col. 64, line 64 - et seq.) as teaching these claims elements:

The computer system in embodiment (3), wherein: the first mode operation is characterized by operating the processor at a first processor clock frequency and a first processor core voltage, the second mode operation is characterized by operating the processor at a second processor clock frequency and a second processor core voltage, and the third mode of operation is characterized by operating the processor at a third processor clock frequency and a third processor core voltage; the second mode of operation being further characterized in that the second processor clock frequency and the second processor core voltage in combination consuming less power than the first processor clock frequency and the first processor core voltage in combination, and the third processor clock frequency and the third processor core voltage in combination consuming less power than the second processor clock frequency and the second processor core voltage in combination.

(Col. 64, lines 64 - et seq.).

Once again, whereas a cited portion of Fung describes the management of servers in different operating modes to optimize power conservation and performance, the claims recite adjusting power supplies in advance to meet future demand requirements. Thus, the rejection appears to equate the general concept of optimization and power conservation discussed with respect to the operation of server modules and the speculative adjustment of power supplies. Because these two concepts are clearly distinguishable, the anticipation rejection of the latter predicated on a disclosure of the former is improper.

In summary, Appellants respectfully contend that the argument provided in the Final Office Action and maintained by the Advisory Action is clearly flawed. While Fung contemplates the management of servers (using different operating modes) in order to

optimize performance and power conservation, Fung does not contemplate the adjustment of power supplies to accommodate a predicted demand requirement. For these reasons, and the reasons described in Appellants' Response dated December 27, 2005, Appellants contend that the rejection of Claim 22 is improper, as is the rejection of Claims 23 through 25, which depend from and provide further patentable limitations to Claim 22. Accordingly, Appellants respectfully request the Board to reverse the 35 U.S.C. § 102(e) rejection of Claims 22-25.

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SUMMARY

Appellants authorize the Commissioner to charge \$500.00 for the Appeal Brief and a One Month Extension Fee of \$120.00 to Deposit Account No. 50-2148 of Baker Botts L.L.P. Appellants believe there are no additional fees due at this time, however, the Commissioner is hereby authorized to charge any fees necessary or credit any overpayment to Deposit Account No. 50-2148 of Baker Botts L.L.P.

Respectfully submitted,

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Date: June 29, 2006

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APPENDIX A - CLAIMS INVOLVED IN APPEAL

1. (Original) A computer system comprising:
a plurality of processing resources operable to process data;
a plurality of power supplies associated with the processing resources, the power supplies operable to supply power to the processing resources; and
a power management engine associated with the power supplies, the power management engine operable to adjust the power supplies to optimize power consumption.
2. (Previously Presented) The system of Claim 1 further comprising a plurality of supply tables associated with the power management engine, the supply tables operable to store supply side information for a plurality of power supplies.
3. (Original) The system of Claim 1 further comprising a plurality of demand tables associated with the power management engine, the demand tables operable to store a plurality of processing resource demand side information.
4. (Original) The system of Claim 1 further comprising the power management engine operable to adjust the power supplies by powering up selected power supplies.
5. (Original) The system of Claim 1 further comprising the power management engine operable to adjust the power supplies by powering down selected power supplies.
6. (Previously Presented) The system of Claim 1 further comprising the power management engine operable to adjust the power supplies by rotating which power supplies provide power to the processing resources.

7. (Original) The system of Claim 1 further comprising the power management engine operable to adjust the power supplies in accordance with an enterprise wide power management strategy.

8. (Original) The system of Claim 1 wherein the processing resources comprise a plurality of servers.

9. (Original) The system of Claim 1 wherein the processing resources comprise a plurality of racks containing a plurality of servers.

10. (Previously Presented) The system of Claim 1 further comprising:
a resource management engine associated with the processing resources; and
the resource management engine operable to scale the plurality of processing resources in relation to a plurality of demand requirements.

11. (Original) The system of Claim 1 further comprising the power management engine operable to monitor power supply start up including a plurality of potential failure modes associated with power supply sequencing to detect power supply startup failure and switch to an alternate power supply.

12. (Original) A method for strategic power sequencing in a computer system including multiple processing resources and multiple power supplies, the method comprising:

- receiving a demand requirement;
- determining if the demand requirement requires a change in operating processing resource;
- determining if the change in operating processing resources requires a power supply change; and
- adjusting the number of operating power supplies to satisfy the change in processing resources.

13. (Original) The method of Claim 12 wherein determining if the change in operating processing resources requires a power supply change comprises consulting a plurality of supply tables and a plurality of demand tables.

14. (Previously Presented) The method of Claim 12 wherein determining if the change in operating processing resources requires a power supply change comprises using the supply tables and demand tables to determine an optimal power supply capacity required for the processing resource change.

15. (Original) The method of Claim 12 wherein adjusting the number of operating power supplies comprises instructing the power supply to power up or power down relative to the demand requirements needed to bring processing resources online and offline.

16. (Original) The method of Claim 12 wherein adjusting the number of operating power supplies comprises turning off currently operating power supplies.

17. (Original) The method of Claim 12 wherein adjusting the number of operating power supplies comprises turning on additional power supplies.

18. (Original) The method of Claim 12 wherein adjusting the number of operating power supplies comprises rotating which power supplies provide power to the processing resources.

19. (Original) The method of Claim 12 wherein adjusting the number of operating power supplies comprises adjusting the power supplies in accordance with an enterprise wide power management strategy.

20. (Original) The method of Claim 12 wherein adjusting the number of operating power supplies comprises determining if the power supplies efficiently satisfy the processing resource change.

21. (Original) The method of Claim 12 wherein determining if the change in operating processing resources requires a power supply change comprises deciding if the power supplies are adequate for the processing resource change.

22. (Original) A method for managing power consumption in a computer system including multiple processing resources and multiple power supplies, the method comprising:
predicting future demand requirements;
determining if a processing resource change is needed to efficiently meet the future demand requirements;
determining if the processing resource change requires a power supply change;
scaling the processing resources in advance to meet the future demand requirements;
and
adjusting the power supplies in advance to meet the processing resource change.

23. (Previously Presented) The method of Claim 22 further comprising dynamically adjusting for global occurrences that affect the future demand requirements.

24. (Original) The method of Claim 22 wherein adjusting the power supplies in advance comprises powering up selected power supplies to satisfy the processing resource change.

25. (Original) The method of 22 wherein adjusting the power supplies in advance comprises powering down selected power supplies to address the processing resource change.

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APPENDIX B - EVIDENCE

NONE

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APPENDIX C: RELATED PROCEEDINGS

NONE